

# NORTEL NETWORKS

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**Raymond L. Strassburger**  
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JAN 8 1999

January 8, 1999

Ms. Magalie Roman Salas  
Secretary  
Federal Communications Commission  
445 Twelfth Street, S.W.  
Washington, DC 20544

EX PARTE NOTICE

**Re: Ex Parte Presentation, Deployment of Wireline Services  
Offering Advanced Telecommunications Capability  
CC Docket No. 98-147; Inquiry Concerning the Deployment  
Of Advanced Telecommunications Capability to All Americans  
in a Reasonable and Timely Fashion CC Docket No. 98-146** /

Dear Ms. Salas:

In accordance with section 1.1206 of the Commission's rules, this letter provides notice that on January 4, 1999, representatives of Nortel Networks had two separate meetings with FCC personnel concerning issues in the referenced proceedings. The first meeting included Larry Strickling, Chief of the Common Carrier Bureau, and Jonathan Askin, Attorney, Common Carrier Bureau, Policy & Program Planning Division. The second meeting included Robert Pepper, Chief, Office of Plans and Policy; Stagg Newman, Chief Technologist, Office of Engineering and Technology; Doug Sicker, Telecom Systems Specialist, Office of Engineering and Technology and Jonathan Askin, Attorney, Common Carrier Bureau, Policy & Program Planning Division. Nortel Networks representatives at the meetings included Steven Schilling, Senior Vice President, Sales & Marketing, Carrier Packet Networks; Wayne Getchell, Director, Subscriber Access Solutions and the undersigned.

Discussion at these meetings was based primarily on previous presentations made by Nortel Networks on November 5 and November 23 as well as the written comments filed by Nortel in these proceedings.

However, additional information was provided by Nortel Networks representatives in the meetings concerning the performance of its 1-Meg Modem product with respect to its spectral compatibility and impact on other service offerings in the same binder group. That information shows that 1-Meg Modem performs significantly better with respect to interference than similar technologies that also meet T1.413 parameters. Enclosed for inclusion in the record of these proceedings is the written empirical data, which leads to this conclusion. Copies are also being provided to the FCC meeting participants.

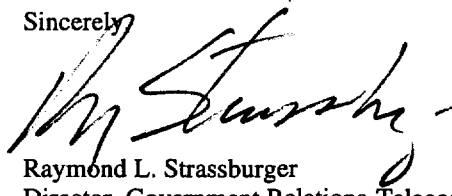
In addition, Nortel Networks representatives provided information concerning the feasibility from a technical perspective in the context of integrated offerings to separate data from voice before switching occurs as a method of achieving loop sharing which in turn allows the separated offering of data and voice services.

Nortel Networks also described methods, such as the franchising of 1-Meg Modem, that it intends to implement in the very near future to make available as quickly as possible the advanced bandwidth capabilities that business and residential consumers are demanding.

Nortel Networks suggested a simple definition for 'harm to the network' and showed a method illustrating how the definition could be applied, to achieve an unambiguous indication of whether or not an alternate service causes harm. The definition would involve establishment of active pairs of a base line service within a binder group. If a different service were substituted for a base line service, this substituted service should have no adverse impact on the other base line services in the binder group. If that impact were to occur, this would constitute harm to the network.

If you have any questions, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Ray Strassburger", written over a horizontal line.

Raymond L. Strassburger  
Director, Government Relations-Telecommunications Policy

RLS/kc

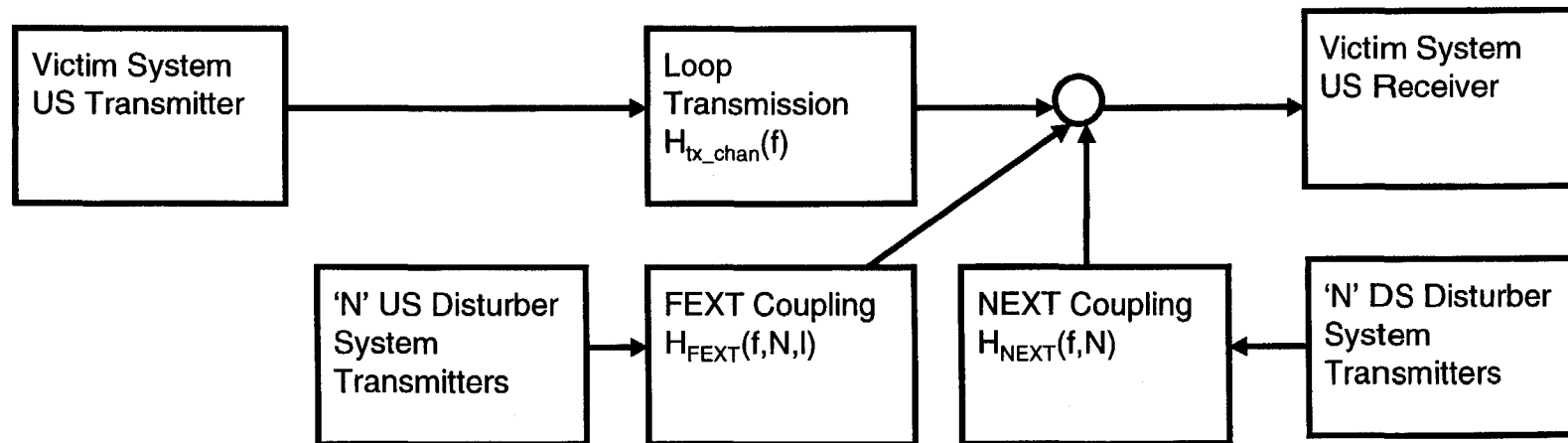
Enclosure

cc: Jonathan Askin, Common Carrier Bureau, Policy & Program Planning Division  
Stagg Newman, Office of Engineering and Technology  
Robert Pepper, Office of Plans and Policy  
Doug Sicker, Office of Engineering and Technology  
Larry Strickling, Common Carrier Bureau

***How the world shares ideas.***

# *Impact of 1-Meg-Modem Disturbers on DMT ADSL Systems*

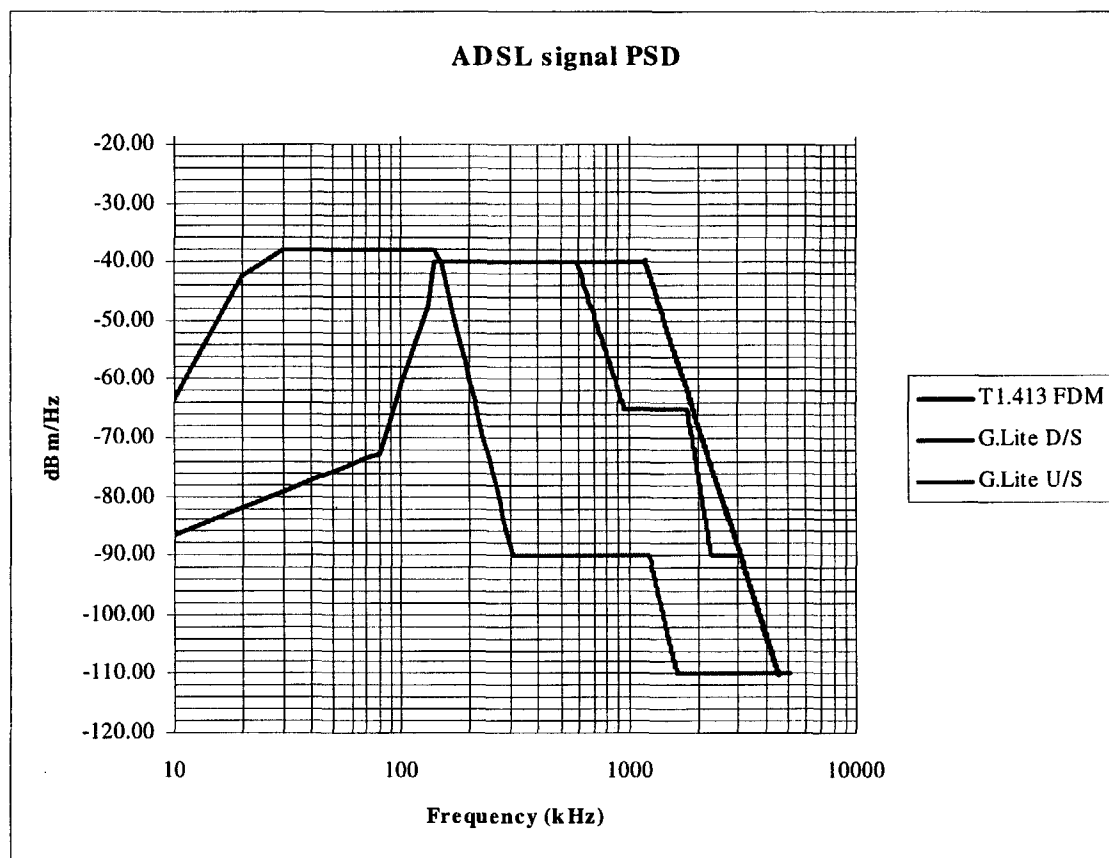
# Transmission Model: Upstream Case



- **Victim systems use defined receiver models**
- **Industry recognized cable modeling and crosstalk coupling formulae**
- **Impact of disturber systems evaluated based on their transmit spectra**

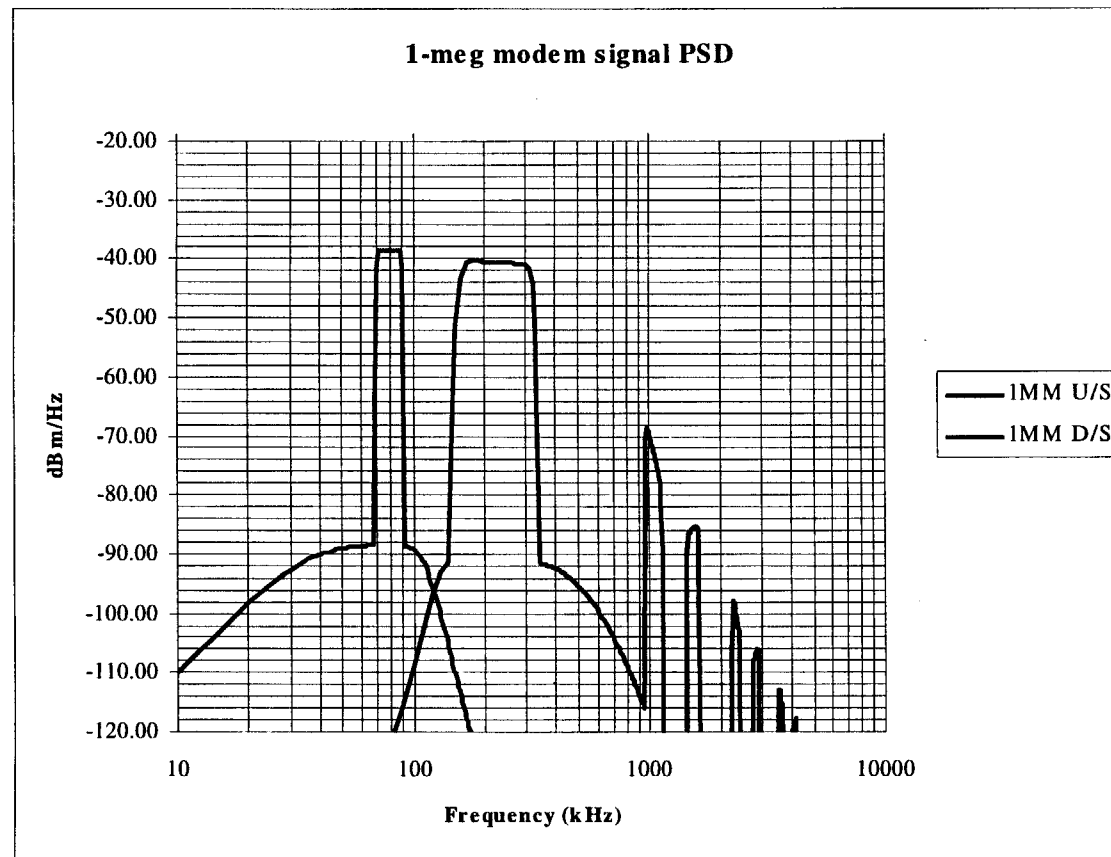
- **FDD DMT ADSL -  
G.992.2(G.lite/splitterless) and T1.413/G.992.1(Full-rate)**
  - margin - 6dB (full-rate), 4dB (G.lite)
  - 3dB coding gain
  - user data rate == raw capacity less 32kbps for framing and the lesser of 32 kbps or 10% for FEC overhead
    - the minimum user data rate of 32kbps corresponds to a minimum raw data rate of 96kbps
  - 7 carrier (~30kHz) separation between US and DS bands
  - maximum constellation size 8 bits/carrier (G.992.2 (G.lite)), 15 bits/carrier (T1.413)
  - -140dBm/Hz AWGN noise floor

# Non-overlapped DMT ADSL PSD Masks



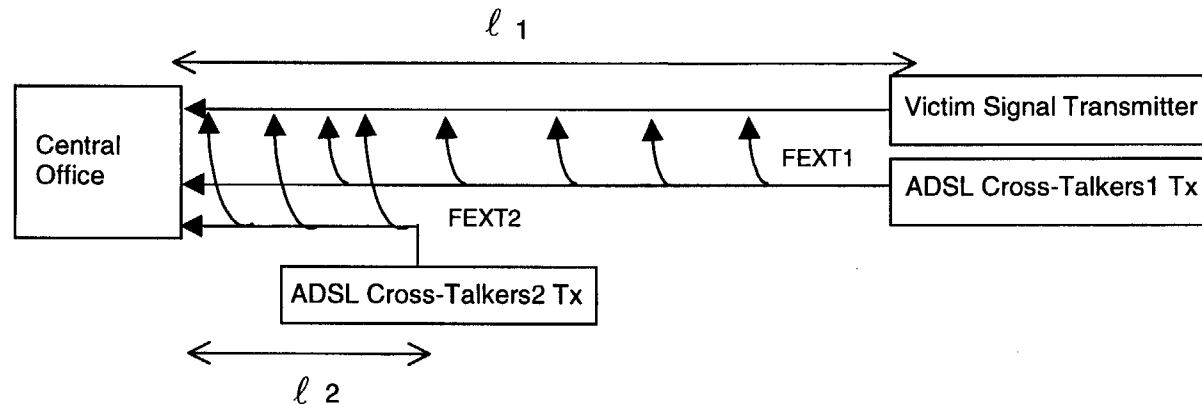
- **Non-overlapped spectra employed for FDD operation to avoid near-end crosstalk between adjacent ADSL transceivers**
  - far-end crosstalk (FEXT) is dominant between these systems

# 1-Meg-Modem Tx PSDs



- **US and DS transmit PSDs fit within T1.413 masks**
  - also a FDD system
  - transmit bands narrower than respective T1.413/G992.1 and G.992.2 equivalents

# Modeling Upstream FEXT Sources



## Configurations affecting $\ell_1$ - $\ell_2$ :

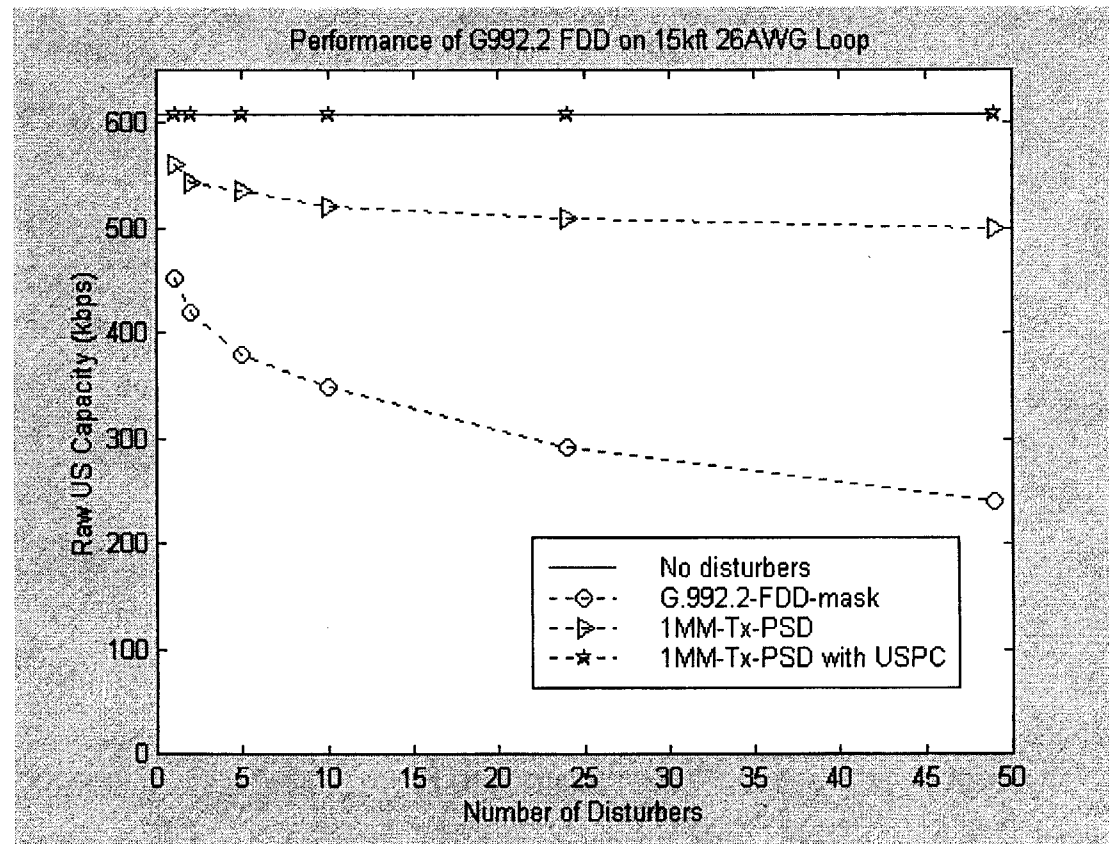
- $\ell_1$  and  $\ell_2$  are typically modeled as equal, i.e. the disturber transmitters are assumed to be at the same distance from the CO as the victim system transmitter
  - this is an overly optimistic model that underestimates FEXT noise
- there are realistic scenarios in which the upstream FEXT sources may be much closer to the CO than the victim system transmitter
  - in neighborhoods with larger lots, the spread between short and long loops can reach 10kft
  - cabling from a off-site CLEC equipment frame to the MDF in the ILEC CO may contain pairs from different feeder binder groups serving nearby and distant neighborhoods



- **Use only as much transmit power as is required to maintain full rate performance.**
  - Seek to achieve about equal receive power from all loops entering the central office by controlling the CPE transmit power.
- **This methodology delivers a more consistent data rate across subscribers and also minimizes the potential data rate degradation over time as more users share the same cable binder.**
- **Applicable to other DSL systems designed to be FEXT-limited**
  - being specified for VDSL systems
  - proposed by Nortel Networks' for subsequent versions of the T1.413/G.992.1 and G.992.2 DMT ADSL standards (non-overlapped spectra operation)

## *G.lite US Capacity vs. ADSL Disturber Type*

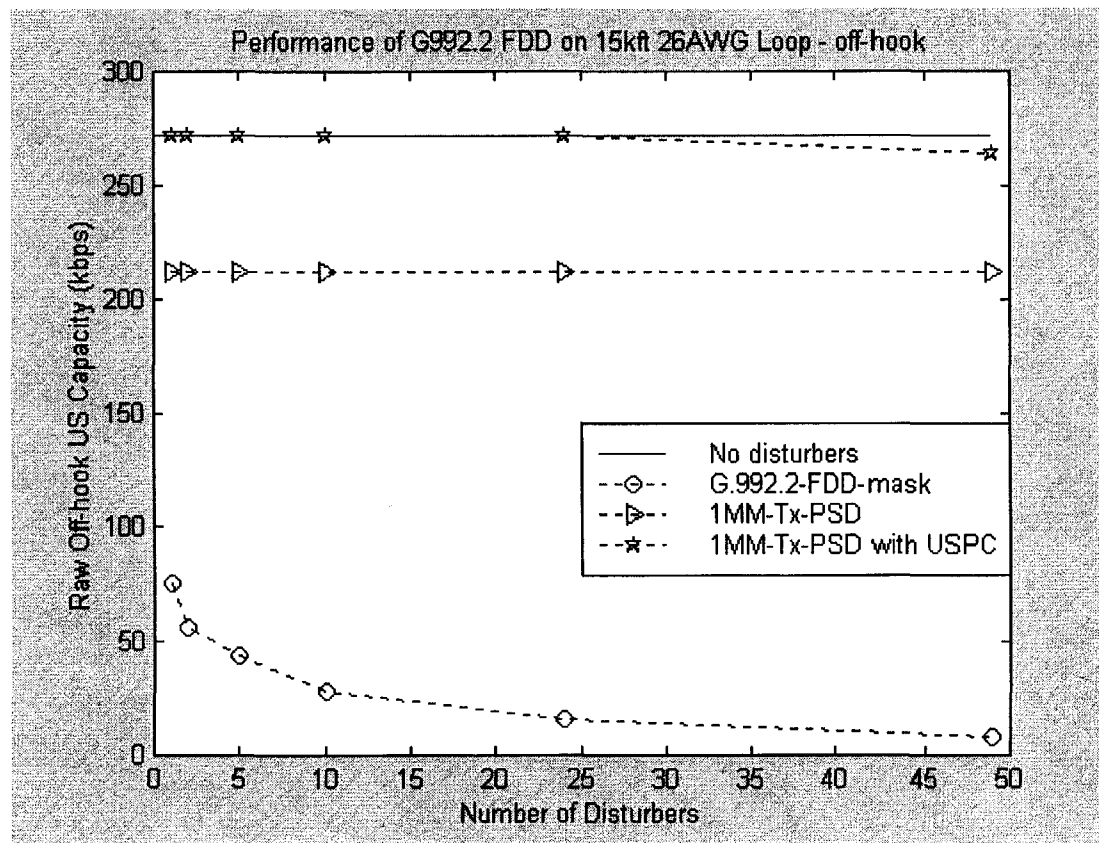
- On 15kft 26AWG loop;
- FEXT sources at 1.2kft from CO



- Even without upstream power control, the impact of 1-Meg-Modem disturbers on the capacity is below that of other G.lite (G.992.2) disturbers
- With upstream power control 1MM FEXT is insignificant

## *G.lite US Capacity vs. ADSL Disturber Type - Off-hook*

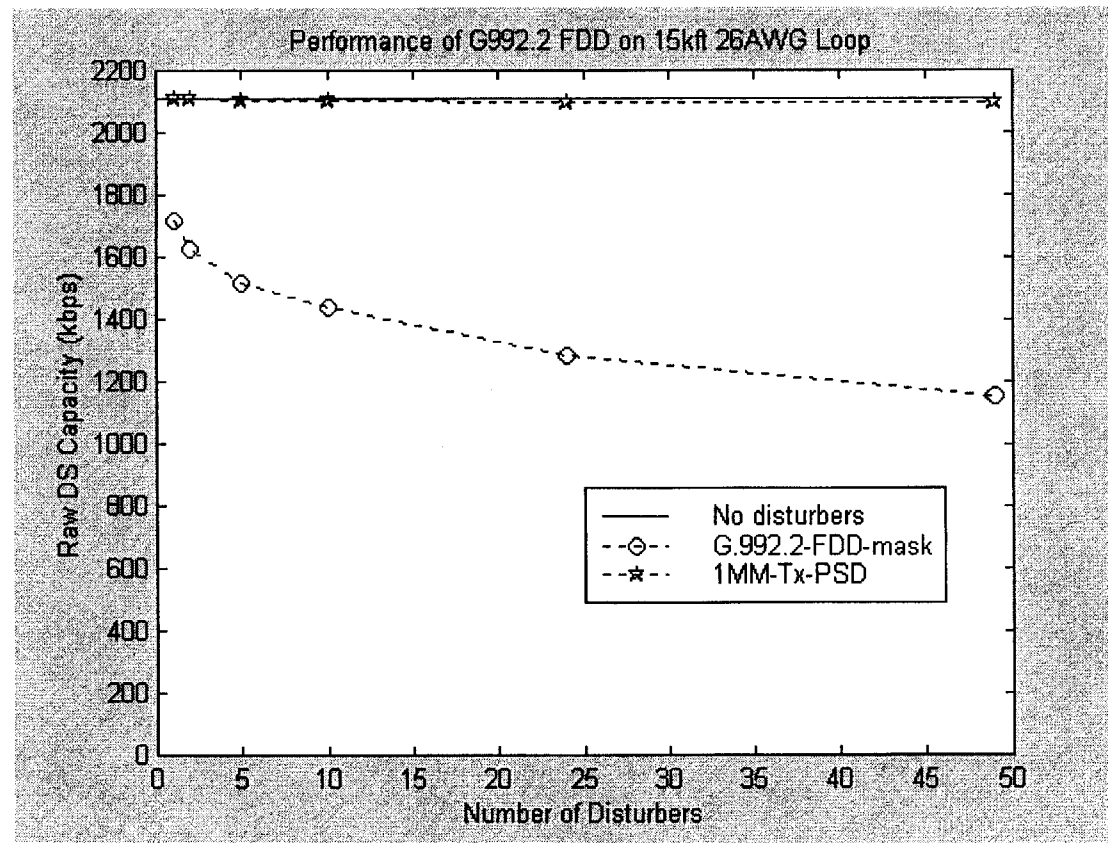
- On 15kft 26AWG loop;
- FEXT sources at 1.2kft from CO
- 20dB US power reduction in victim system (for parallel off-hook set)



- Service would be lost with G.lite disturbers in this scenario (with no upstream power control in G.lite)

## *G.lite DS Capacity vs. ADSL Disturber Type*

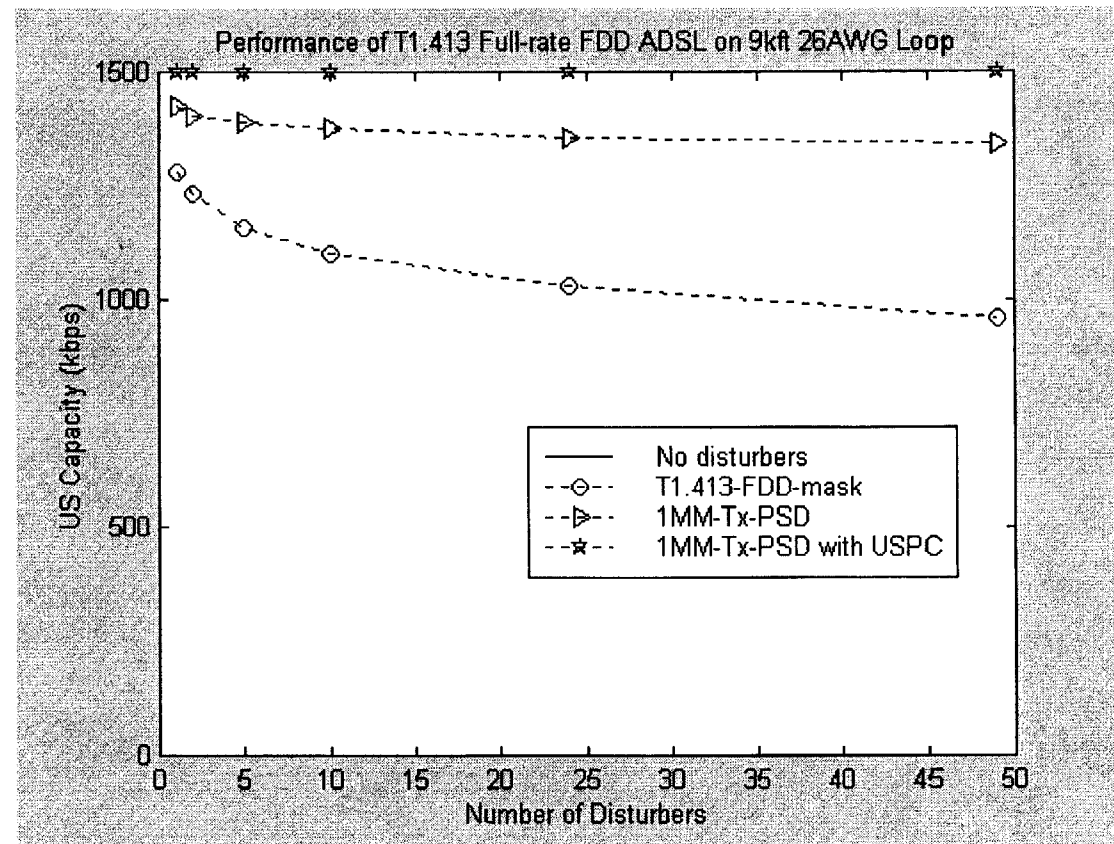
- On 15kft 26AWG loop



- The impact of 1-Meg-Modem disturbers on the capacity of G.lite FDD ADSL is below that of other G.lite (G.992.2) disturbers
  - due to narrower 1MM transmit spectra

## T1.413 US Capacity vs. ADSL Disturber Type

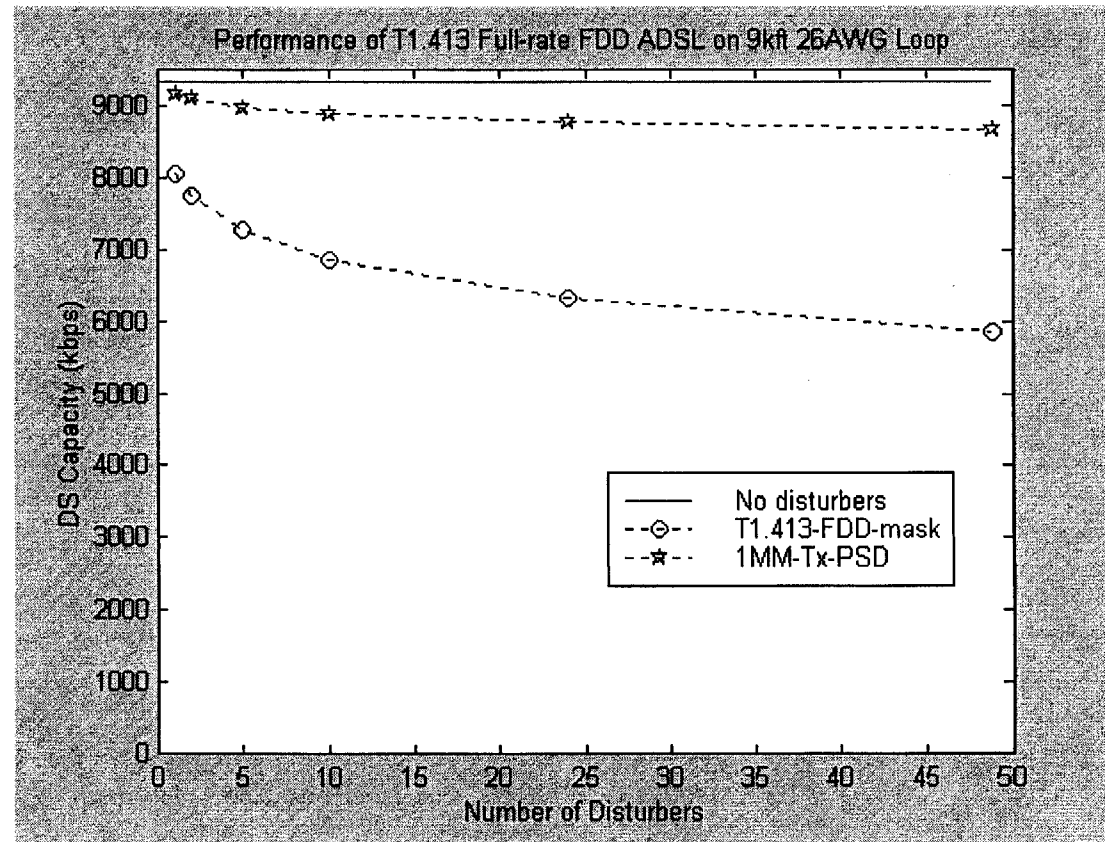
- On 9kft 26AWG loop;
- FEXT sources at 1.2kft from CO



- Even without upstream power control, the impact of 1MegModem disturbers on the capacity is below that of other T1.413 disturbers
  - due to narrower 1MM transmit spectra
- With upstream power control 1MM FEXT is insignificant

## T1.413 DS Capacity vs. ADSL Disturber Type

- On 15kft 26AWG loop



- The impact of 1MegModem disturbers on the capacity is below that of other T1.413 disturbers
  - due to narrower 1MM transmit spectra

- **The impact of 1-Meg-Modem disturbers on the capacity of T1.413 or G.lite FDD ADSL is less than that of other T1.413 or G.lite disturbers**
- **With upstream power control, 1-Meg-Modem delivers a more consistent data rate across subscribers and also minimizes the potential data rate degradation over time as more users share the same cable binder**
  - Upstream power control is being proposed for future versions of full-rate (T1.413/G.992.1) and splitterless (G.992.2) DMT ADSL